International Islamic University Chittagong

Department of Electrical and Electronic Engineering

B. Sc. Engineering in EEE

Final Exam, Spring 2022

Course Code: CHEM 2301 Course Title: Chemistry

Time: 2 hours 30 minutes Full Marks: 50

(i) The figures in the right-hand margin indicate full marks

(ii) Course Outcomes and Bloom's Levels are mentioned in additional Columns

Course Outcomes (COs) of the Questions	
CO1	Develop the chemical engineering idea and understanding of the chemical behavior, physical properties of the common substances.
CO2	Demonstrate the basic proficiency to solve the chemical problems and discussing the interactions between matter and energy at the atomic and molecular levels.

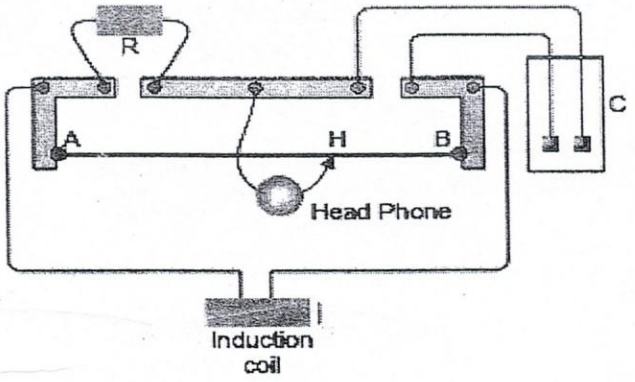
Bloom's Levels of the Questions						
Letter Symbols	R	U	App	An	E	C
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

Part A

[Answer the questions from the followings]

1. a) What is transport number? Establish the relation between specific conductance and equivalent conductance. CO1 R, An 2+3 =5

1. b) CO2 E 5



A conductance cell containing a decinormal solution of a salt occupying a volume between two platinum electrodes 2.5 cm apart and 6.2 cm^2 area is connected with Wheatstone bridge. A resistance (R= summation of last two digit of your metric id) is unplugged when sliding contact is moved across a 10 m wire until the headphone is minimum at 7 m. Calculate equivalent

conductance of the cell.

2.	a)	Define lowering of vapor pressure. Develop an equation for the determination of molecular weight of a solute from relative lowering of vapor pressure.	CO1	R, C	2+3 =5
2.	b)	Calculate the normality and ppm concentration of a solution containing 6.3 g of $Al(OH)_3$ dissolved in 750 ml solution.	CO2	E	5
		Or,			
2.	a)	What is cell constant? Explain the effect of equivalent conductance with the change of concentration or dilution	CO1	R, C	2+3 =5
2.	b)	Calculate the molarity and ppb concentration of a solution containing 9.5 g of $Ca(OH)_2$ dissolved in 1000 ml solution.	CO2	E	5

Part B

[Answer the questions from the followings]

3.	a)	Define Chemical kinetics. Explain Pseudo-unimolecular reaction with examples.	CO1	U, C	2+2 =4
3.	b)	Prove that $K = \frac{1}{t}\frac{x}{a(a-x)}$ Where the symbols have their usual meanings. Explain activation energy and activated complex in terms of Transition State Theory.	CO2	Ap, C	4+2
4.	a)	Discuss about pseudo order reaction. Derive the rate constant expression for a second order reaction	CO1	U, An	2+3 =5
4.	b)	The rate constants for a reaction at 20°C and 30°C are 3.5 × 10–5 sec–2 and 7.0 × 10–5 sec–2. Evaluate the activation energy of the reaction.	CO2	E	5
5.	a)	Distinguish between physical and chemical adsorption.	CO1	An	5
5.	b)	Use the Langmuir assumptions to produce an expression for surface area of an adsorbent which shows the relation between number of active sites and pressure	CO2	Ap	5
		Or,			
5.	a)	Distinguish between order and molecularity of chemical reaction.	CO1	An	5
5.	b)	Draw the concentration versus time graphs for zero, first and second order reactions.	CO2	Ap	5